

**Notice of Allowability**

Application No.

10/045,722

Examiner

Mark W. Bockelman

Applicant(s)

LU ET AL.

Art Unit

3766

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to interview of 12-08-2005.
2. ☒ The allowed claim(s) is/are 8-28.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 12-5-2005.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

  
MARK BOCKELMAN  
Art Unit 3766

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Paul McDowall on 12-08-2005.

The application has been amended as follows:

8. A method for use by an Implantable Medical Device (IMD) of filtering an analog cardiac electrogram (EGM) signal having a predetermined frequency bandwidth, the method comprising:

obtaining an analog cardiac electrogram (EGM) signal from an implantable sensor coupled to the IMD;

filtering the EGM signal with a high pass filter (HPF) having a cut-of frequency within a predetermined frequency bandwidth, and wherein a low-frequency band portion of the predetermined frequency bandwidth is attenuated in the filtered EGM signal;

sampling and digitizing the filtered EGM signal as a digital data set in a time order [to generate] and optionally, generating a compressed digital data set having at least a 2:1 data compression factor;

filtering [the] one of said digital data set or said compressed data set in reverse time order employing a digital Infinite Impulse Response (IIR) filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF to substantially remove distortions of the filtered analog EGM signal introduced by the HPF; and  
analyzing [the filtered compressed data set] a reconstituted EGM to determine whether cardiac ischemia is present.

15. Apparatus for use by an Implantable Medical Device (IMD) for filtering a physiological signal having a predetermined frequency bandwidth, the method comprising:

a sensor coupled to the IMD for sensing an analog cardiac electrogram (EGM) signal;

a high pass filter (HPF) for filtering the analog EGM signal, the HPF having a the cut-off frequency within the predetermined frequency bandwidth, wherein a low-band portion of the predetermined frequency bandwidth is attenuated in the filtered analog EGM signal;

means for sampling and digitizing the filtered analog EGM signal as a digital data set in a real time order;

means for compressing the digital data set via a lossy data compression technique wherein said lossy data compression technique comprises a peak preserving compression algorithm providing at least a 2:1 data compression;

a digital Infinite Impulse Response (IIR) filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF for reverse time order filtering [the] either said digital data set or said compressed digital data set to substantially remove distortions of the filtered analog physiologic signal introduced by the HPF; and

means for comparing an EGM reconstituted from said reverse filtered data to a template to detect ischemia. [the compressed digital data set to one of a non-ischemia EGM template and a prior non-ischemic EGM of a patient and for one of triggering storage of at least a portion of a cardiac PQRST complex in the event that the comparison reveals the presence of an cardiac ischemic event and transmitting via telemetry at least a portion of the cardiac PQRST complex to an external receiving device.]

22. Apparatus for use by an Implantable Medical Device (IMD) for filtering a physiological signal having a predetermined frequency bandwidth, the method comprising:

a sensor coupled to the IMD for sensing an analog cardiac electrogram (EGM) signal;

a high pass filter (HPF) for filtering the analog [ETM] EGM signal, the HPF having a the cut-off frequency within the predetermined frequency bandwidth, wherein a low-band portion of the predetermined frequency bandwidth is attenuated in the filtered analog EGM signal;

means for sampling and digitizing the filtered EGM signal as a digital data set in a real time order;

optionally, means for compressing said digital data set;

a digital Infinite Impulse Response (IIR) filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF for reverse time order filtering the digital data set, or a compressed data set if said optional means for compressing is included, to substantially remove distortions of the filtered analog EGM signal introduced by the HPF; and

means for comparing an EGM reconstituted from said reverse filtered data to a template to detect ischemia. [the compressed digital data set to one of a non-ischemia EGM template and a prior non-ischemic EGM of a patient and for triggering storage of at least a portion of a cardiac RQRST complex in the event that the comparison reveals the presence of an cardiac ischemic event.]

The following is an examiner's statement of reasons for allowance: The prior art of record does not teach the use of an analog HPF and a IIR for reverse time filtering to minimize operational computations and EGM distortion so as to detect ischemia in an IMD .

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

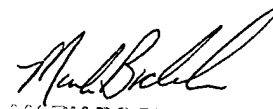
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark W. Bockelman whose telephone number is (571) 272-4941. The examiner can normally be reached on Monday - Friday 10:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pezzuto can be reached on (571) 272 -6996. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MWB

December 8, 2005

  
Mark W. Bockelman  
Examiner